

Connecticut's Nitrogen Trading Program

Lee E. Dunbar, CT-DEP



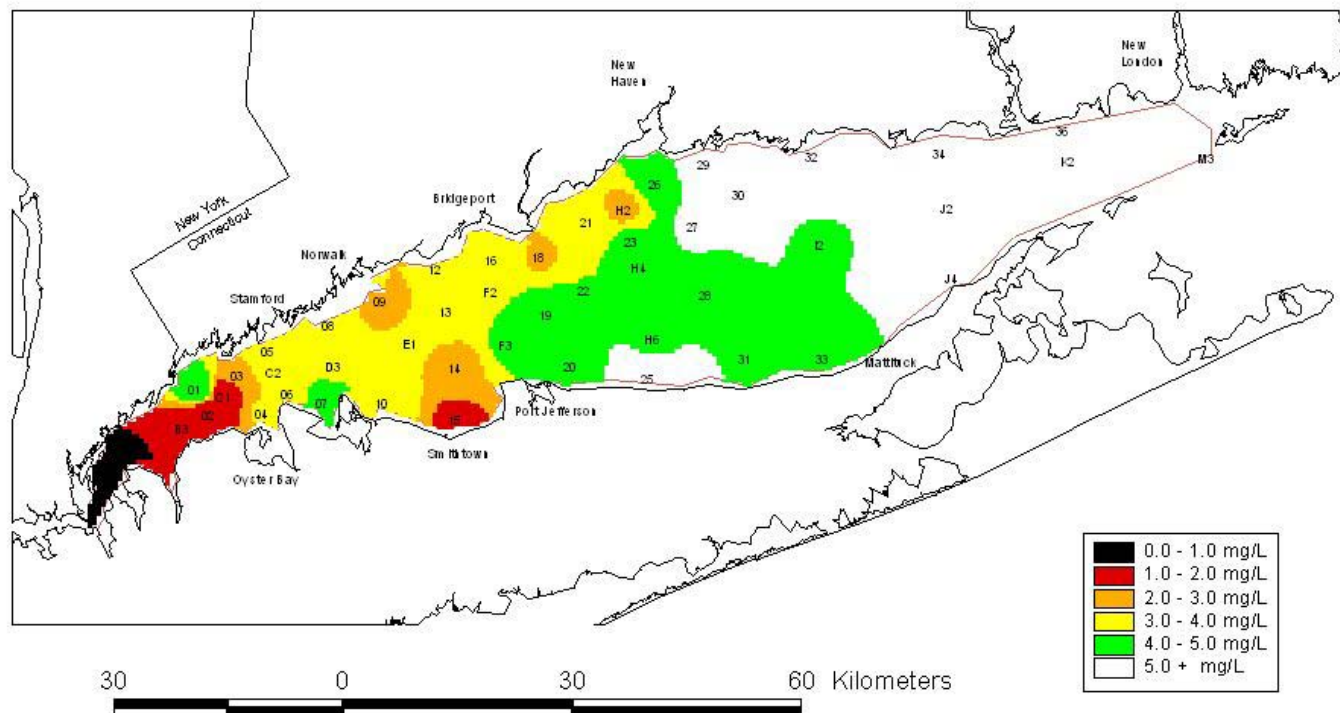


Long Island Sound Water Quality Monitoring Program

Summer Hypoxia Survey

Cruise: WQAUG99

August 2-5, 1999



Initial TMDL Allocations

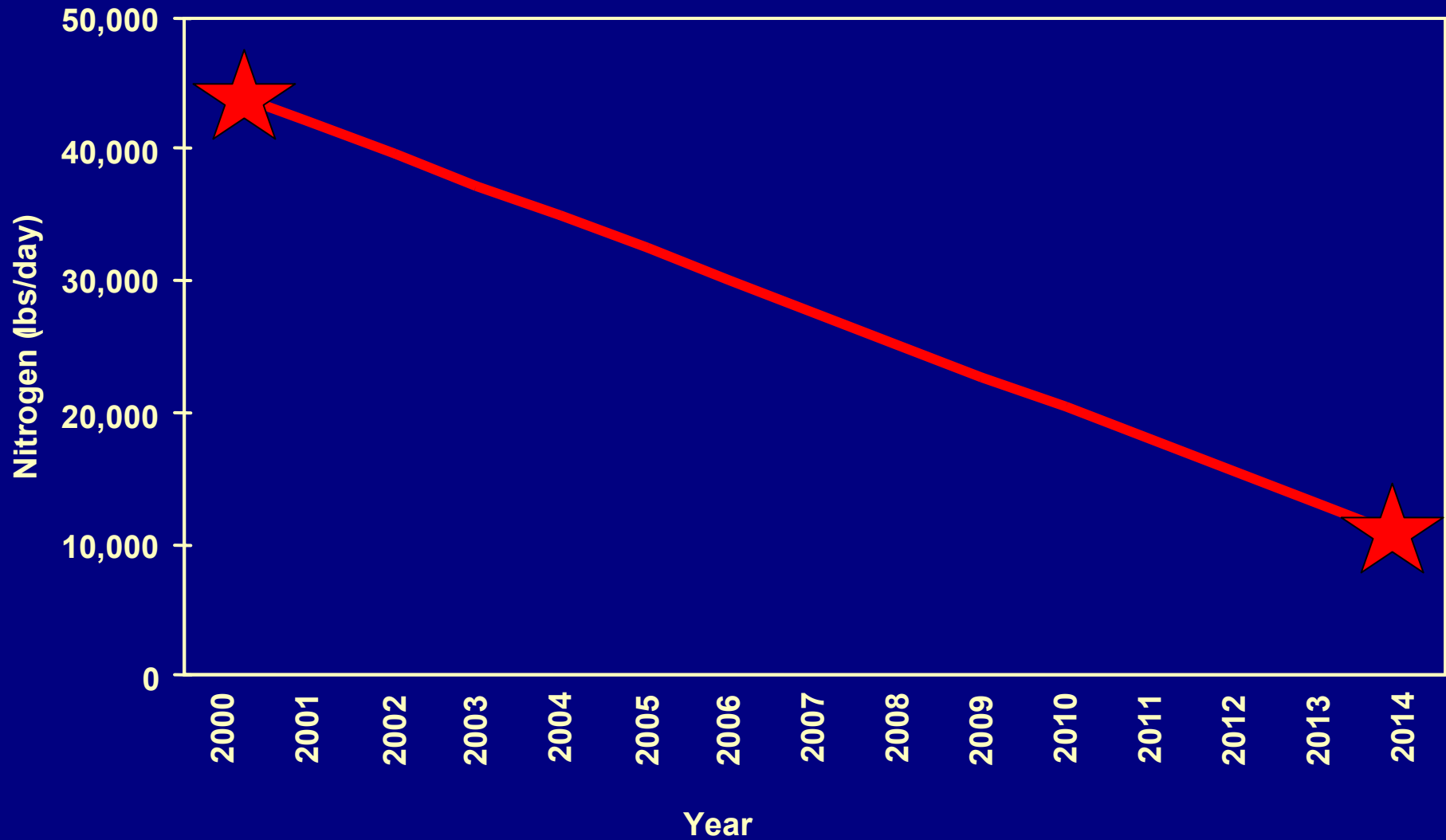
2000 Starting Point

The baseline loading to Long Island Sound from all municipal facilities combined was established in the TMDL

Final TMDL Allocations 2014 Ending Point

The TMDL requires the loading to
Long Island Sound from all
municipal facilities combined be
reduced by 64%

TMDL/WLA IMPLEMENTATION











Traditional NPDES Implementation:

- Your Pipe
- Your Permit
- Your Problem
- High Compliance Cost
- High Non-Compliance Cost
- Rewards The Last

Difficult to Implement

Alternative Trading Implementation:

- Our Pipe
- Our Permit
- Our Problem
- Lower Compliance Cost
- Lower Non-Compliance Cost
- Rewards The First

Incentive to Provide Treatment

Public Act 01-180*

An Act Concerning Nitrogen Reduction In Long Island Sound

- Establish a Nitrogen Credit Advisory Board
- Authority to Issue a General Permit
- Provides for an Alternate Compliance Program
- Necessary to support trading program

* Now codified at 22a-521 to 527 CGS

12 Member Nitrogen Credit Advisory Board

- 3 Government Members

 - Commissioner of DEP (Chair)

 - Secretary of the Treasury

 - Office of Policy and Management

- 9 Public Members

 - 1 Small Town Credit Buyer

 - 1 Small Town Credit Seller

 - 1 Big City Credit Buyer

 - 1 Big City Credit Seller

 - 1 Official of a major POTW

 - 1 Municipal Public Works Official

 - 3 at large with experience in treatment plant operations, environmental law, or finance

Board Members Appointed

- Governor (1)
- Speaker of the House (1)
- President pro tempore of the Senate (1)
- Majority Leader of the House (2)
- Majority Leader of the Senate (2)
- Minority Leader of the House (1)
- Minority Leader of the Senate (1)

Nitrogen Credit Advisory Board

Duties and Responsibilities

- Submit annual report to legislature on
progress on meeting reduction goals
adequacy of financing
recommendations for program changes
- Make recommendations to DEP
Commissioner on program implementation.
- Arbitrate appeals related to the annual value
of a credit.

How Trading Works

- **Setting Permit Limits**
- **Determining Value of Credit**
- **Executing Trades**

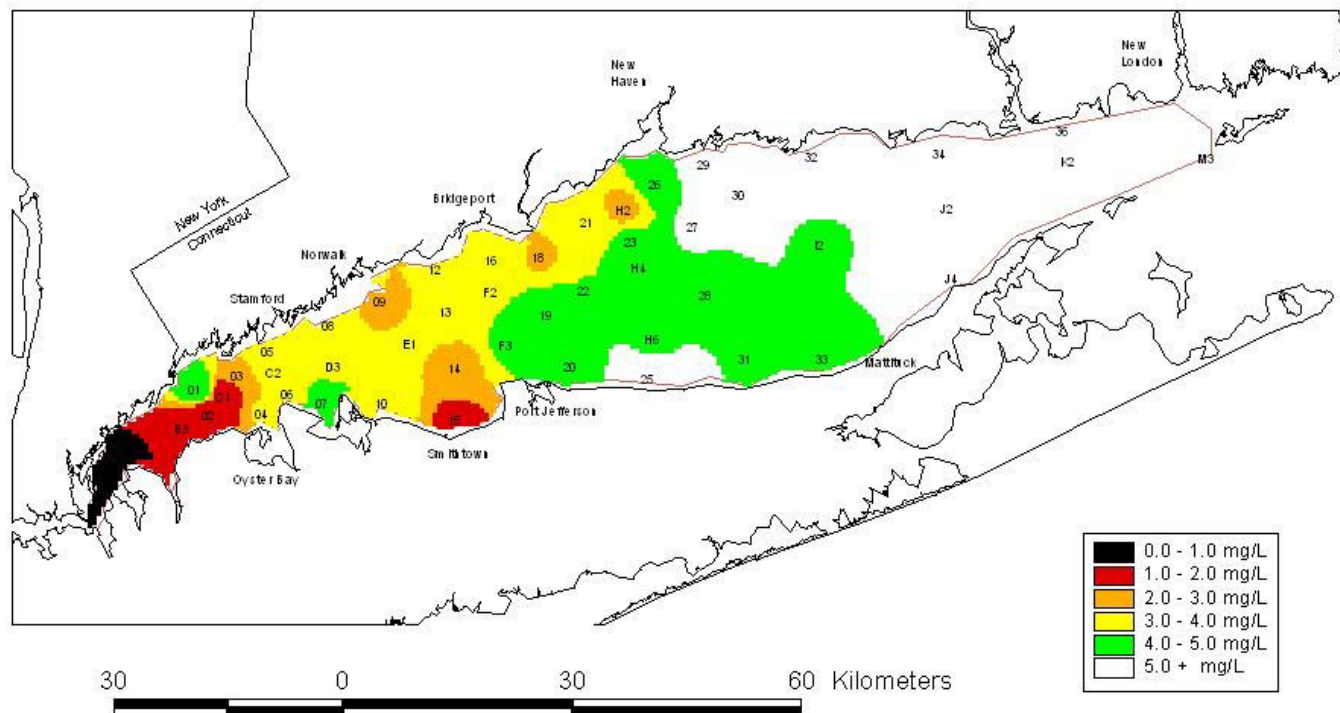


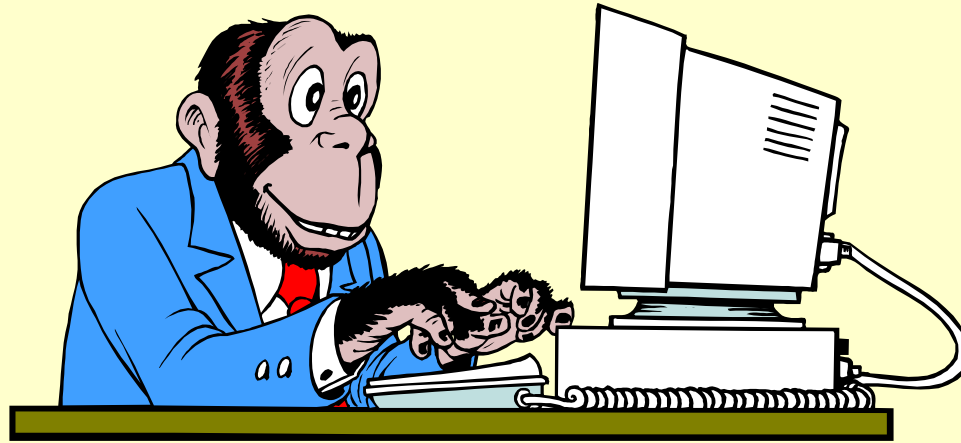
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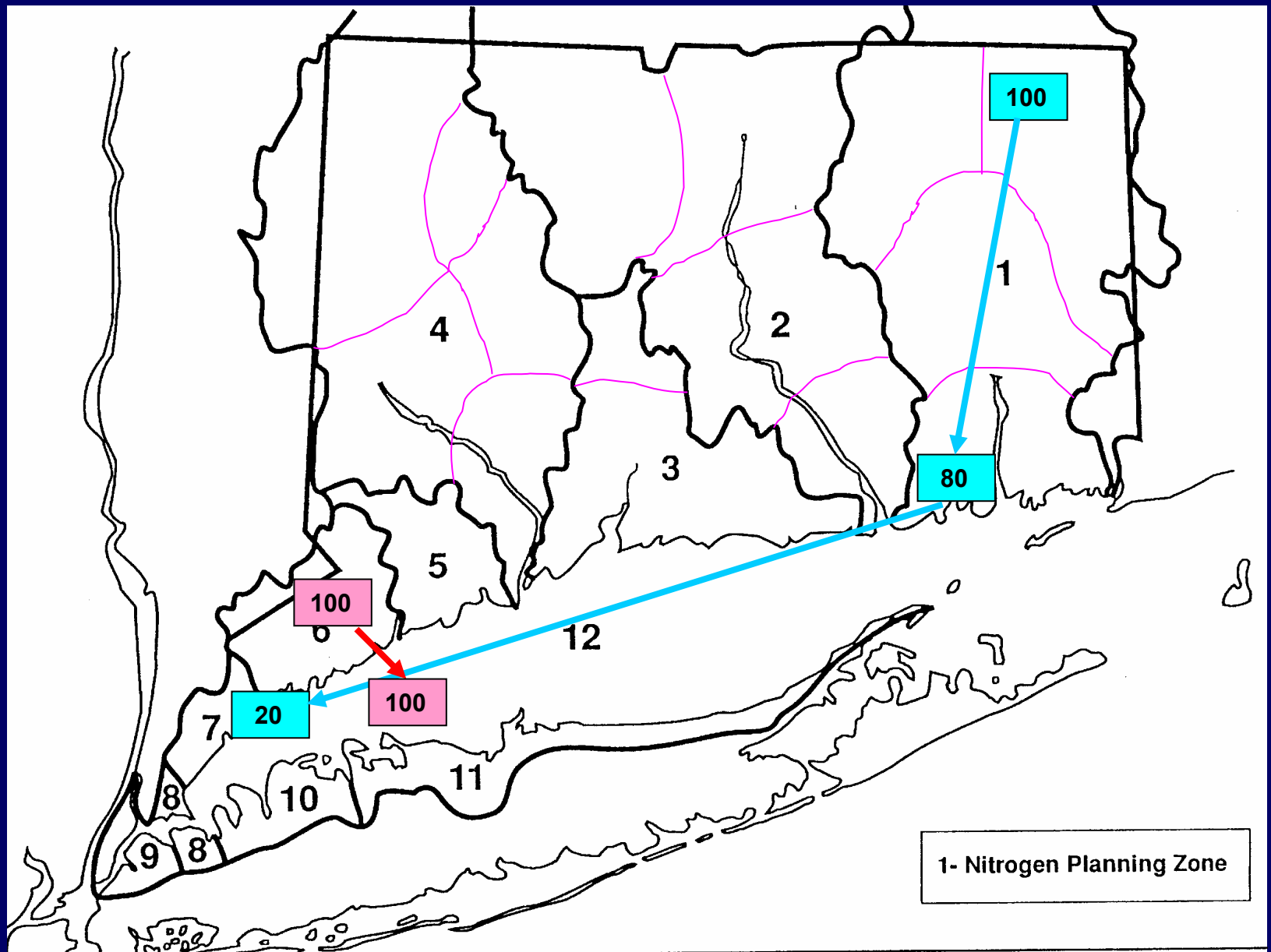
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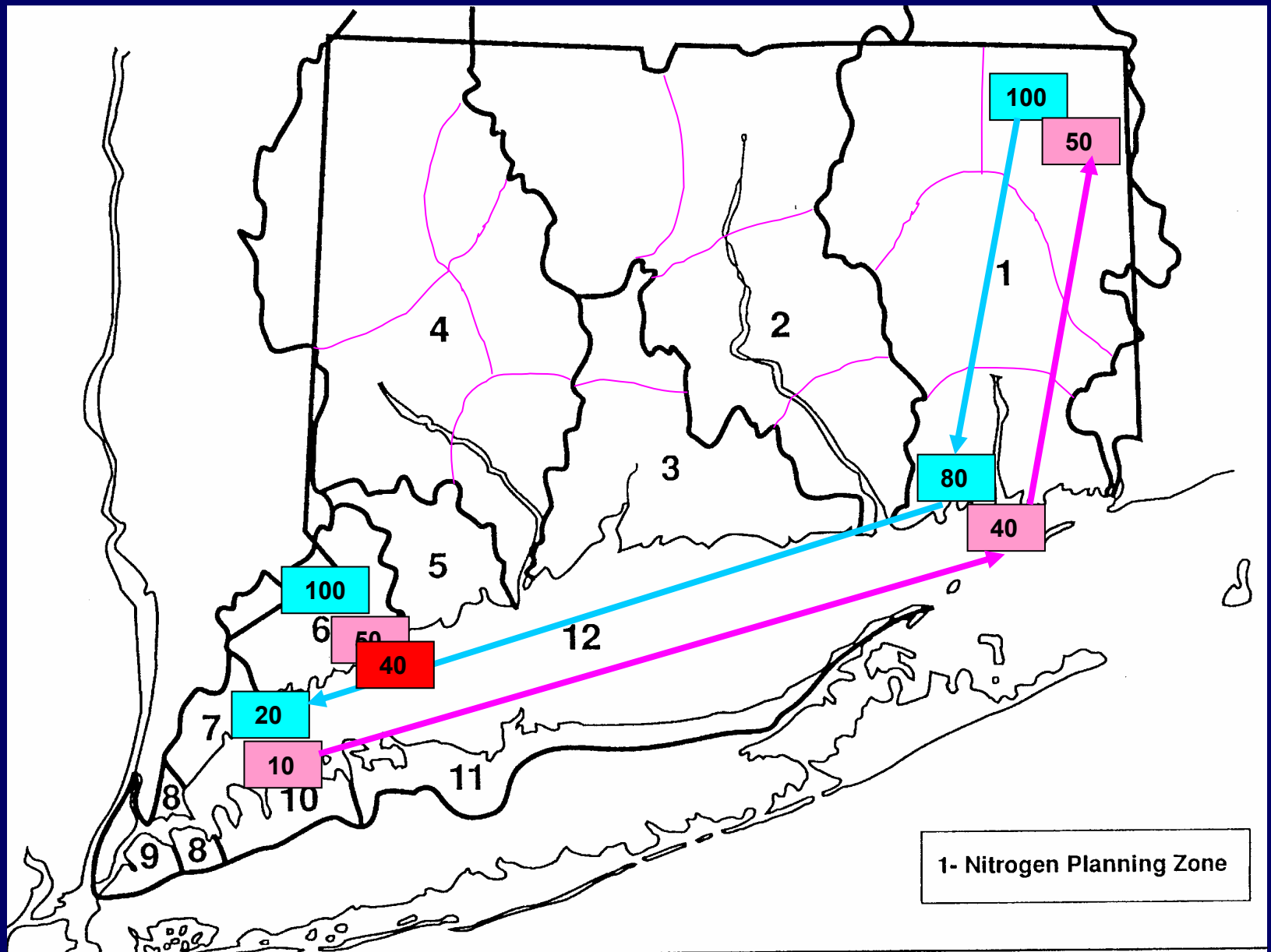
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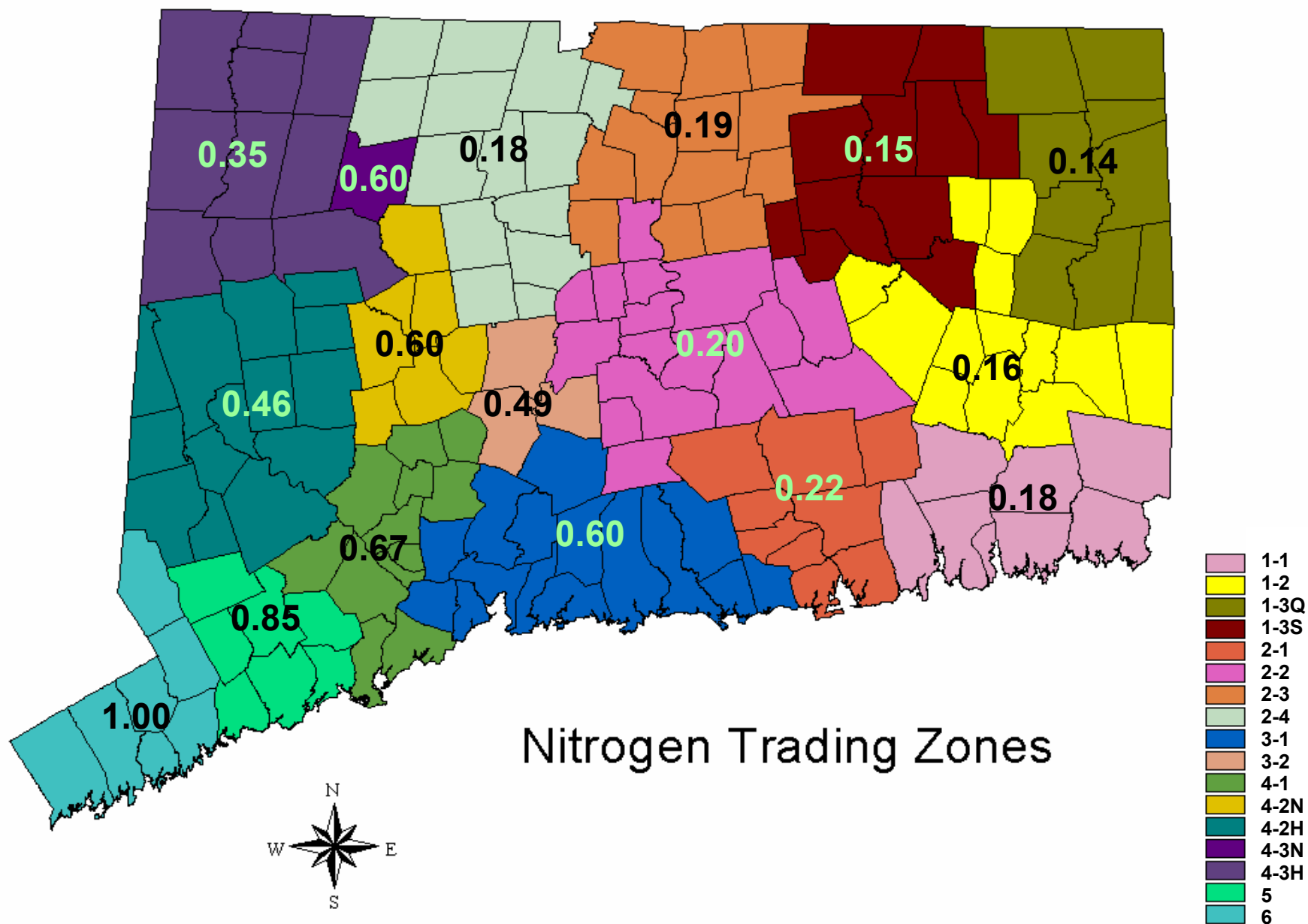




DEP used a computer model to
account for differences in the
geographic location of each facility
relative to Long Island Sound







General Permit for Nitrogen Discharges

- Places all POTWs in Connecticut under one nitrogen bubble
- Provides total nitrogen effluent limits over 15 years
- Allows for a alternate compliance schedule

GENERAL PERMIT OVERVIEW

EFFECTIVE DATE:

January 1, 2002

WHO IS COVERED:

Listed POTWs

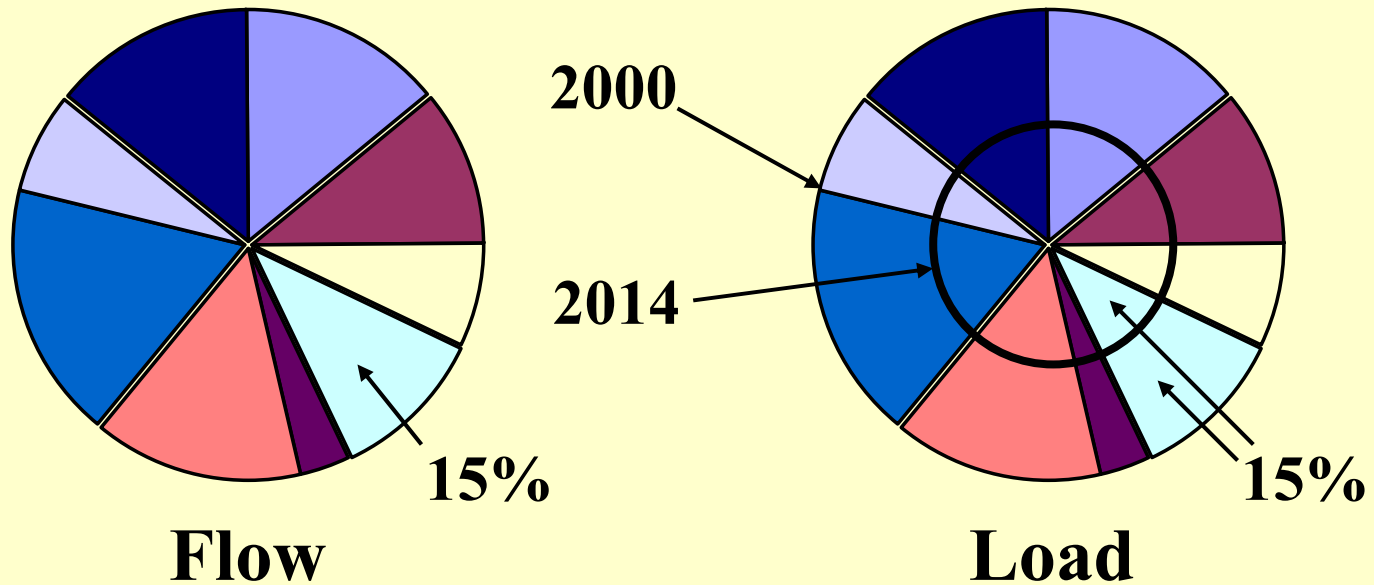
WHAT IS AUTHORIZED:

Discharge of Total Nitrogen



Ammonia
+ Organic Nitrogen
+ Nitrate
+ Nitrite

Total Nitrogen (mg/L as N)



Each facility was allocated a percentage of the total statewide TMDL loading equal to their percentage contribution to the statewide current discharge flow rate

PERMIT LIMITS:

ANNUAL MASS LOADING OF TOTAL NITROGEN

JEWETT CITY



2002	31 lbs/day
2003	28 lbs/day
2004	26 lbs/day
2005	23 lbs/day
2006	19 lbs/day
↓	
2014	15 lbs/day

PERMIT CONDITIONS:

OPERATE NITROGEN REMOVAL PROCESS EQUIPMENT



MONITORING REQUIREMENTS:

FREQUENCY

Total Nitrogen Concentration

POTWs Less Than 10 MGD Design Flow

Weekly

POTWs Greater Than 10 MGD Design Flow

Twice per Week

Average Daily Flow

All POTWs

Daily

SAMPLE LOCATION

All POTWs

Final Effluent

SAMPLE TYPE

All POTWs

Daily Composite

CALCULATION OF MASS LOADING TOTAL NITROGEN

MONTHLY MASS LOADING EQUALS

$$\begin{array}{rcl} & \text{Average Total Nitrogen Concentrations for Month} & \\ \times & & \text{(rounded to nearest 0.01 mg/L)} \\ & \text{Average Daily Flow for the Month} & \\ \times & & \text{(rounded to nearest 0.01 MGD)} \\ & 8.346 & \\ & \text{(result rounded to nearest whole number for reporting to DEP)} & \end{array}$$

ANNUAL MASS LOADING OF TOTAL NITROGEN EQUALS

$$\begin{array}{rcl} & \text{Sum of Monthly Loadings Divided by 12} & \\ & & \text{(rounded to the nearest whole number)} \end{array}$$

COMPLIANCE:

- Meet All Permit Conditions (operate efficiently)
- Perform Required Monitoring & Reporting
- Meet Annual Total Nitrogen Limit
 1. Discharge Less Total Nitrogen than Limit
or
 2. Purchase Credits to Meet Limit

Setting Permit Limits

Buyers = Sellers

- **Project End of Pipe Load from each POTW in year 1 of permit period**
- **‘Equalize’ End of Pipe Load for geography (e-factor)**
- **Sum Equalized Loads to Statewide Total**
- **Set annual limit for each POTW based on their achieving a percentage reduction equal to the projected aggregate reduction statewide.**
- **Iterate process for permit years 2-5 accounting for planned completion of treatment upgrades (as new facilities come on line the aggregate percent reduction will increase)**
- **Check to confirm on-track to meet 2014 goal**

Value of a Credit

(Partial) Cost of Nitrogen Treatment

divided by

E-Pounds of Nitrogen Removed (from Baseline)

Cost of Treatment

Capital Cost = Annual Repayment Amount for CWF Loan
(\$1M loan = \$61,160 / yr)

O&M Cost = Based on Surveys of Project Facilities

Total Cost = Capital Cost + O&M Cost

Not considered: Grants, self-financed upgrades, costs not related to nitrogen removal, O&M costs at non-project facilities.

Nitrogen Removed

Only Nitrogen removed at Project Facilities is considered

Nitrogen removed is calculated by subtraction from baseline not load prior to upgrade

End-of-Pipe reductions are converted to E-Pounds by application of the equalization factor assigned to that facility.

Executing Trades

January 1, 2005 –	Trading year begins.
Mid-summer 2005 -	O&M survey undertaken
December 2005 -	Trading year ends
January 15, 2006 -	December data due at DEP
January 30, 2006 -	DEP completes audit of 2005 data
February 2006 -	Staff provide Board with proposed value of a credit for 2005.
February 2006	Board forwards recommendations on credit cost to CDEP Commissioner
March 31, 2006 -	DEP Commissioner issue draft ruling on credit cost for 2005 and provides notice to individual facilities of 2005 balances.
March-June -	Reserved for possible appeal resolution.
July 31, 2006 -	Facilities must purchase credits if needed to comply with permit
August 14, 2006 -	Exchange purchases credits from facilities that have excess credits to sell.

SELLING Credits**Facility Name**

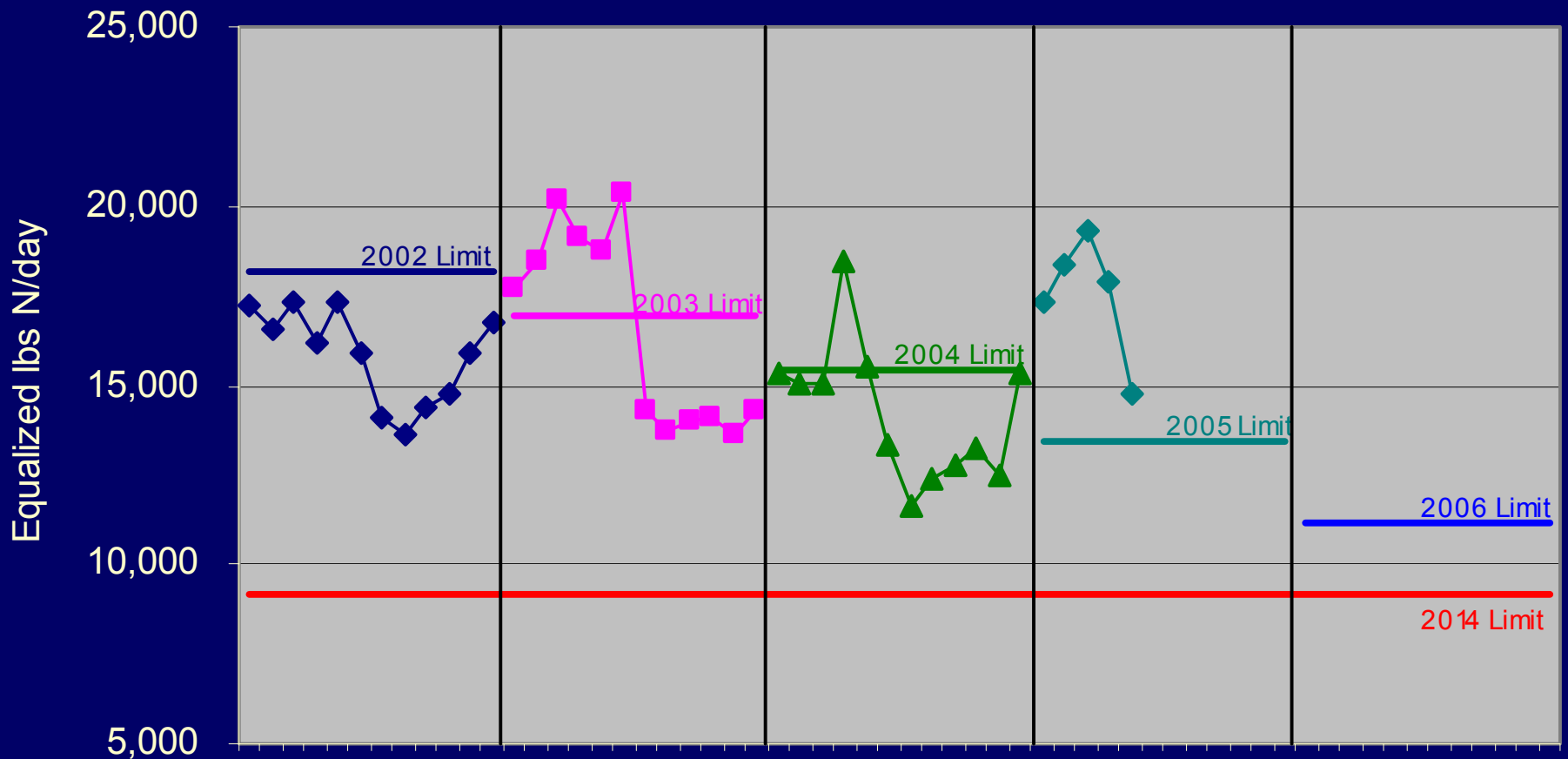
★ NEW HAVEN EAST WPCF	\$527,372
★ WATERBURY WPCF	\$367,693
★ BRIDGEPORT WEST WPCF	\$346,654
★ NORWALK WPCF	\$292,745
★ GREENWICH WPCF	\$277,640
★ FAIRFIELD WPCF	\$154,069
★ STRATFORD WPCF	\$83,853
★ BRIDGEPORT EAST WPCF	\$82,537
★ BRANFORD WPCF	\$79,839
★ NAUGATUCK TREATMENT Co.	\$78,113
★ NEW CANAAN WPCF	\$63,296
★ STAMFORD WPCF	\$61,858
★ TORRINGTON WPCF	\$55,672
★ MILFORD HOUSATONIC WPCF	\$46,264
★ NEW LONDON WPCF	\$42,466
★ WEST HAVEN WPCF	\$34,094
★ ENFIELD WPCF	\$29,246
★ DERBY WPCF	\$28,915
★ SEYMOUR WPCF	\$20,240
★ MILFORD BEAVER BROOK WPCF	\$17,831
★ RIDGEFIELD SOUTH ST. WPCF	\$15,824
★ THOMASTON WPCF	\$12,515
★ EAST WINDSOR WPCF	\$9,703
★ KILLINGLY WPCF	\$6,445
★ SUFFIELD WPCF	\$5,193
★ SALISBURY WPCF	\$3,021
★ SOUTHBURY TR. SCHOOL WPCF	\$2,978
★ PORTLAND WPCF	\$2,446
★ NORFOLK WPCF	\$1,510
★ LEDYARD WPC	\$1,036
★ LITCHFIELD WPCF	\$1,007
★ WINDSOR LOCKS WPCF	\$820
★ SPRAGUE WPCF	\$230
★ NORTH CANAAN WPCF	\$0
★ PLYMOUTH WPCF	\$0

TOTAL \$2,753,125**BUYING Credits****Facility Name**

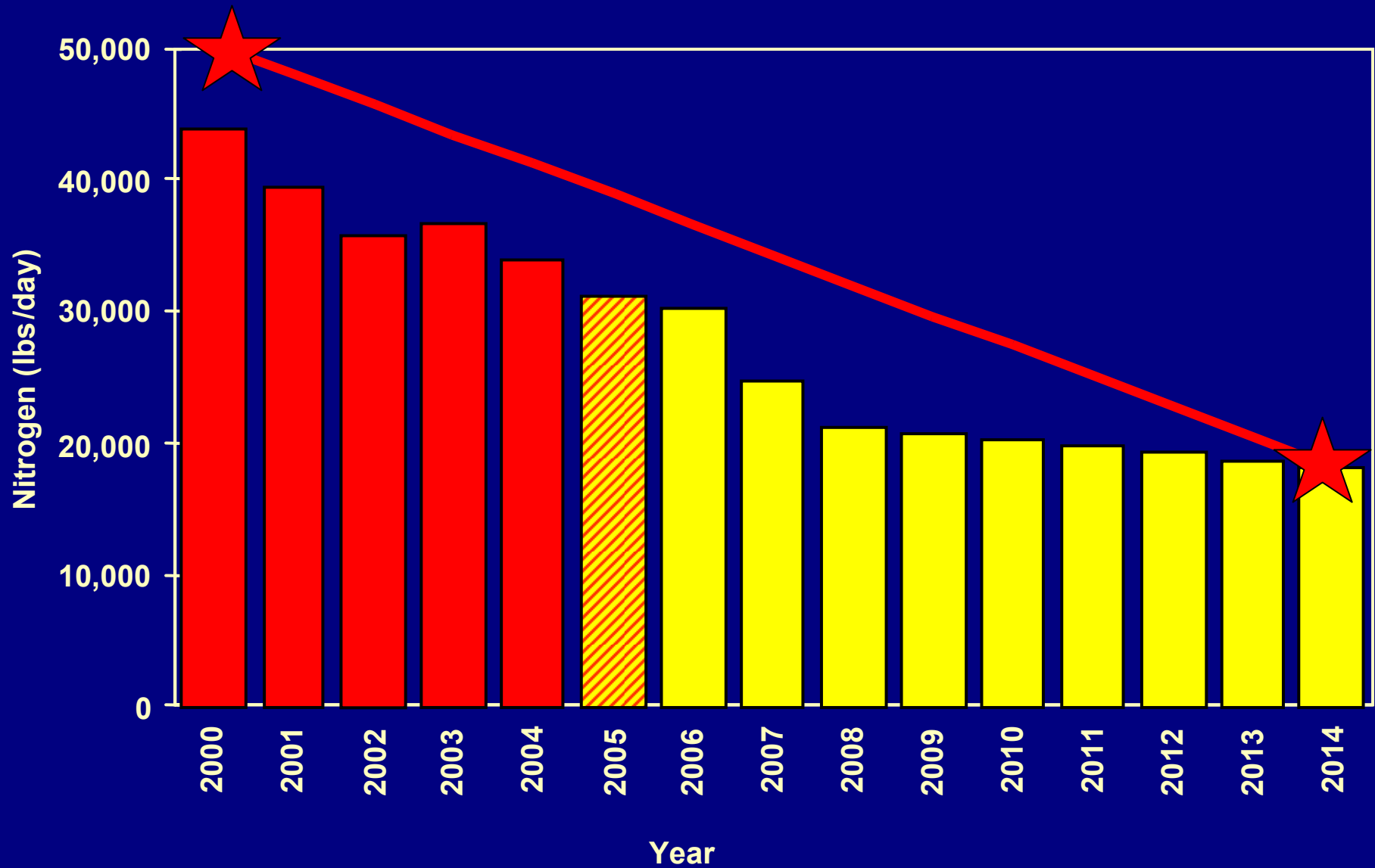
HARTFORD WPCF	\$365,967
DANBURY WPCF	\$363,622
SHELTON WPCF	\$165,778
SOUTHINGTON WPCF	\$153,666
CHESHIRE WPCF	\$127,937
NORTH HAVEN WPCF	\$90,197
WALLINGFORD WPCF	\$72,071
VERNON WPCF	\$58,491
NORWICH WPCF	\$58,002
MERIDEN WPCF	\$43,351
EAST HARTFORD WPCF	\$42,912
ROCKY HILL WPCF	\$41,574
WINDSOR POQUONOCK WPCF	\$38,812
ANSONIA WPCF	\$33,734
MANCHESTER WPCF	\$29,519
GLASTONBURY WPCF	\$28,627
GROTON TOWN WPCF	\$24,729
★ BRISTOL WPCF	\$20,456
★ SIMSBURY WPCF	\$18,773
★ SOUTH WINDSOR WPCF	\$18,723
★ PLAINVILLE WPCF	\$17,867
★ FARMINGTON WPCF	\$13,724
★ WINSTED WPCF	\$12,170
★ BEACON FALLS WPCF	\$9,638
★ MATTABASSET WPCF	\$9,351
★ PUTNAM WPCF	\$8,257
★ MIDDLETOWN WPCF	\$8,200
★ CANTON WPCF	\$7,509
★ WESTPORT WPCF	\$7,337
★ UCONN WPCF	\$4,316
★ MONTVILLE WPCF	\$3,237
★ NEW MILFORD WPCF	\$2,978
★ STONINGTON BOROUGH WPCF	\$2,848
★ STAFFORD SPRINGS WPCF	\$2,374
★ PLAINFIELD NORTH WPCF	\$2,014
★ GROTON CITY WPCF	\$1,942
★ JEWETT CITY WPCF	\$1,834
★ THOMPSON WPCF	\$1,813
★ WINDHAM WPCF	\$1,187
★ STONINGTON MYSTIC WPCF	\$1,036
★ NEWTOWN WPCF	\$993
★ STONINGTON PAWCATUCK WPCF	\$856
★ EAST HAMPTON WPCF	\$432
★ PLAINFIELD VILLAGE WPCF	\$101

TOTAL \$1,918,955**Difference: Selling - Buying = \$834,170**

Total Nitrogen Loading to Western Long Island Sound Based on Monthly Equalized Loading



TMDL/WLA IMPLEMENTATION



The Beginning

- Gary.Johnson@PO.State.CT.US

- or call 860-424-3754

- Paul.Stacey@PO.State.CT.US

- Or call 860-424-3728

- Lee.Dunbar@PO.State.CT.US

- Or call 860-424-3731

- For a copy of the 2004 Connecticut Nitrogen Credit Advisory Board's Annual Report

- www.dep.state.CT.US/wtr/lis/nitrocntr/2004annrpt.pdf